

## Amendments to the Claims

1       Claim 1 (currently amended): A computer-implemented method of managing ~~at least one a~~  
2       collaborative process performed in accordance with a first entity and at least a second entity, the  
3       method comprising ~~the steps of~~:

4               a computer obtaining information associated with the ~~at least one~~ collaborative process  
5       used to design and develop a given product; and  
6               based on at least a portion of the obtained information, the computer dynamically building  
7       and maintaining an information structure ~~in the form of~~ as a context pyramid structure  
8       ~~representative of the collaborative process so as~~ to assist at least one of the first entity and the  
9       second entity in managing at least a portion of the collaborative process;

10               wherein the context pyramid structure ~~provides a representation of the~~ represents a status  
11       of the collaborative process ~~including one or more global and local tasks, and comprises results of~~  
12       ~~a time offset calculation, a checkpoint calculation and a potential energy level calculation for the~~  
13       ~~one or more global and local tasks involved in the collaborative process~~ using a plurality of flow  
14       lines that represent a plurality of levels of resolution of tasks in the collaborative process; and  
15               wherein the building and maintaining comprises:

16               creating a lowest-level flow line to represent a lowest-level of resolution, the  
17       lowest-level flow line corresponding to a timeline for completing the collaborative process, the  
18       timeline containing a plurality of checkpoints for completing the collaborative process, each of the  
19       checkpoints represented on the lowest-level flow line by a node, the nodes comprising at least a  
20       starting node representing a starting checkpoint on the timeline and an ending node representing  
21       an ending checkpoint on the timeline; and

22 iteratively creating at least one next-higher level flow line to represent a next-  
23 higher level of resolution from a next-lower level flow line, for at least one pair of consecutive  
24 nodes on the flow line of the next-lower level, the next-higher level flow line corresponding to a  
25 next-higher-resolution timeline containing a plurality of higher-resolution checkpoints for  
26 completing a portion of the collaborative process that occurs between the checkpoints represented  
27 by the consecutive nodes on the lower-level flow line, each of the higher-resolution checkpoints  
28 represented on the next-higher level flow line by a node, the nodes on the next-higher level flow  
29 line comprising at least a starting node representing a starting checkpoint on the next-higher-  
30 resolution timeline and an ending node representing an ending checkpoint on the next-higher-  
31 resolution timeline.

1 Claim 2 (currently amended): The method of claim 1, further comprising ~~the step of~~  
2 incorporating annotated business data into the information structure.

1 Claim 3 (currently amended): The method of claim 1, further comprising the step of  
2 incorporating annotated design data into the information structure.

1 Claim 4 (currently amended): The method of claim 1, further comprising ~~the step of~~ controlling  
2 data flow associated with the at least one collaborative process based on the information  
3 structure.

1 Claim 5 (currently amended): The method of claim 1, further comprising the step of fetching one

2 or more design data features for at least one of monitoring and tracking the ~~at least one~~  
3 collaborative process using the context pyramid structure.

1 Claim 6 (original): The method of claim 1, wherein the at least one collaborative process is a  
2 business process.

1 Claim 7 (original): The method of claim 1, wherein the at least one collaborative process is an  
2 engineering design process.

Claim 8 (canceled)

1 Claim 9 (original): The method of claim 1, wherein the information structure is multi-  
2 dimensional.

1 Claim 10 (original): The method of claim 1, wherein the information structure is multi-resolution.

1 Claim 11 (original): The method of claim 1, wherein the obtained information comprises  
2 annotated data.

1 Claim 12 (original): The method of claim 1, wherein the obtained information comprises user  
2 input.

Claims 13 - 14 (canceled)

1       Claim 15 (currently amended): The method of claim 1, further comprising ~~the step of~~ analyzing at  
2       least one of the obtained information and the information structure.

1       Claim 16 (currently amended): The method of claim 15, further comprising ~~the step of~~ generating  
2       one or more action representations based on the analyzing [[step]].

1       Claim 17 (currently amended): The method of claim 16, wherein the analyzing [[step]] is rule-  
2       based.

1       Claim 18 (currently amended): Apparatus for managing ~~a~~ ~~at least one~~ collaborative process  
2       performed in accordance with a first entity and at least a second entity, the apparatus comprising:  
3               a memory; and

4               at least one processor coupled to the memory and operative to: [[(i)]] obtain information  
5       associated with the ~~at least one~~ collaborative process used to design and develop a given product;  
6       and [[(ii)]] based on at least a portion of the obtained information, dynamically build and maintain  
7       an information structure ~~in the form of~~ as a context pyramid structure ~~representative of the~~  
8       ~~collaborative process~~ so as to assist at least one of the first entity and the second entity in  
9       managing at least a portion of the collaborative process, wherein:

10               the context pyramid structure ~~provides a representation of the~~ represents a status  
11       of the collaborative process ~~including one or more global and local tasks, and comprises results of~~

12 a time offset calculation, a checkpoint calculation and a potential energy level calculation for the  
13 one or more global and local tasks involved in the collaborative process using a plurality of flow  
14 lines that represent a plurality of levels of resolution of tasks in the collaborative process; and

15 the building and maintaining comprises:

16 creating a lowest-level flow line to represent a lowest-level of resolution,  
17 the lowest-level flow line corresponding to a timeline for completing the collaborative process, the  
18 timeline containing a plurality of checkpoints for completing the collaborative process, each of the  
19 checkpoints represented on the lowest-level flow line by a node, the nodes comprising at least a  
20 starting node representing a starting checkpoint on the timeline and an ending node representing  
21 an ending checkpoint on the timeline; and

22 iteratively creating at least one next-higher level flow line to represent a next-  
23 higher level of resolution from a next-lower level flow line, for at least one pair of consecutive  
24 nodes on the flow line of the next-lower level, the next-higher level flow line corresponding to a  
25 next-higher-resolution timeline containing a plurality of higher-resolution checkpoints for  
26 completing a portion of the collaborative process that occurs between the checkpoints represented  
27 by the consecutive nodes on the lower-level flow line, each of the higher-resolution checkpoints  
28 represented on the next-higher level flow line by a node, the nodes on the next-higher level flow  
29 line comprising at least a starting node representing a starting checkpoint on the next-higher-  
30 resolution timeline and an ending node representing an ending checkpoint on the next-higher-  
31 resolution timeline.

1 Claim 19 (currently amended): An article of manufacture for managing a at least one

2 collaborative process performed in accordance with a first entity and at least a second entity,  
3 comprising a computer readable storage medium containing one or more programs which when  
4 executed implement the steps of:

5 obtaining information associated with the ~~at least one~~ collaborative process used to design  
6 and develop a given product; and

7 based on at least a portion of the obtained information, dynamically building and  
8 maintaining an information structure ~~in the form of~~ as a context pyramid structure ~~representative~~  
9 ~~of the collaborative process so as~~ to assist at least one of the first entity and the second entity in  
10 managing at least a portion of the collaborative process;

11 wherein the context pyramid structure ~~provides a representation of the~~ represents a status  
12 of the collaborative process ~~including one or more global and local tasks, and comprises results of~~  
13 ~~a time offset calculation, a checkpoint calculation and a potential energy level calculation for the~~  
14 ~~one or more global and local tasks involved in the collaborative process using a plurality of flow~~  
15 lines that represent a plurality of levels of resolution of tasks in the collaborative process; and

16 wherein the building and maintaining comprises:

17 creating a lowest-level flow line to represent a lowest-level of resolution, the  
18 lowest-level flow line corresponding to a timeline for completing the collaborative process, the  
19 timeline containing a plurality of checkpoints for completing the collaborative process, each of the  
20 checkpoints represented on the lowest-level flow line by a node, the nodes comprising at least a  
21 starting node representing a starting checkpoint on the timeline and an ending node representing  
22 an ending checkpoint on the timeline; and

23 iteratively creating at least one next-higher level flow line to represent a next-

24 higher level of resolution from a next-lower level flow line, for at least one pair of consecutive  
25 nodes on the flow line of the next-lower level, the next-higher level flow line corresponding to a  
26 next-higher-resolution timeline containing a plurality of higher-resolution checkpoints for  
27 completing a portion of the collaborative process that occurs between the checkpoints represented  
28 by the consecutive nodes on the lower-level flow line, each of the higher-resolution checkpoints  
29 represented on the next-higher level flow line by a node, the nodes on the next-higher level flow  
30 line comprising at least a starting node representing a starting checkpoint on the next-higher-  
31 resolution timeline and an ending node representing an ending checkpoint on the next-higher-  
32 resolution timeline.

Claim 20 (canceled)

1 Claim 21 (new): The method of claim 1, wherein the building further comprises:  
2       adding a virtual node beneath the lowest-level flow line;  
3       adding, to the flow line for each of the levels above the lowest-level flow line, a starting  
4       node corresponding to the starting node of the lowest-level flow line and an ending node  
5       corresponding to the ending node of the lowest-level flow line; and  
6       forming the context pyramid structure from the plurality of flow lines by connecting the  
7       virtual node to the starting node of the highest of the levels with a first vector and connecting the  
8       virtual node to the ending node of the highest of the levels with a second vector and then  
9       compressing all of the flow lines to cause the starting nodes to be placed on the first vector and  
10      the ending nodes to be placed on the second vector.

1       Claim 22 (new): The method of claim 1, wherein the maintaining further comprises performing a  
2       checkpoint calculation for at least one of the levels of resolution of tasks in the collaborative  
3       process, when any of the checkpoints represented by the nodes on the flow line is missed,  
4       comprising recomputing a time offset for each successive one of the checkpoints on the flow line  
5       and adjusting the node that represents the successive one on the flow line.

1       Claim 23 (new): The apparatus of claim 18, wherein the building further comprises:  
2               adding a virtual node beneath the lowest-level flow line;  
3               adding, to the flow line for each of the levels above the lowest-level flow line, a starting  
4       node corresponding to the starting node of the lowest-level flow line and an ending node  
5       corresponding to the ending node of the lowest-level flow line; and  
6               forming the context pyramid structure from the plurality of flow lines by connecting the  
7       virtual node to the starting node of the highest of the levels with a first vector and connecting the  
8       virtual node to the ending node of the highest of the levels with a second vector and then  
9       compressing all of the flow lines to cause the starting nodes to be placed on the first vector and  
10      the ending nodes to be placed on the second vector.

1       Claim 24 (new): The article of manufacture of claim 19, wherein the building further comprises:  
2               adding a virtual node beneath the lowest-level flow line;  
3               adding, to the flow line for each of the levels above the lowest-level flow line, a starting  
4       node corresponding to the starting node of the lowest-level flow line and an ending node

5 corresponding to the ending node of the lowest-level flow line; and  
6 forming the context pyramid structure from the plurality of flow lines by connecting the  
7 virtual node to the starting node of the highest of the levels with a first vector and connecting the  
8 virtual node to the ending node of the highest of the levels with a second vector and then  
9 compressing all of the flow lines to cause the starting nodes to be placed on the first vector and  
10 the ending nodes to be placed on the second vector.